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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Xingbai He

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EXAMINER

CWERN, JONATHAN

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3737

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/817,316	Applicant(s) HE ET AL.	
	Examiner Jonathan G. Cwern	Art Unit 3737	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 June 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) 19-27 and 35-40 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 and 28-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 June 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

The drawings were received on 6/20/08. These drawings are acceptable.

Claim Objections

Claims 16-18, 31, and 32 are objected to because of the following informalities:

In claim 16, "the heart" lacks antecedent basis.

In claim 18, "the quantitative data" lacks antecedent basis.

In claim 31, the preamble is missing the word "of" before "claim 28".

In claim 32, lines 1-2 appear to be grammatically incorrect. A transitioning phrase such as "further comprising" appears to be missing.

In claim 32, "the heart" lacks antecedent basis. Claim 33 refers to "a heart" and is dependent similarly on claim 28.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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In claim 1, there is no connection provided between the steps. For example, the claim fails to set forth that the gate is formed using the reference image; the claim fails to set forth what is used from the Doppler data; and the claim fails to set forth that the displacement data is determined from the Doppler data. In addition, the preamble of claim 1 is directed to measuring tissue movement which is not consistent with the limitation in the claims of determining displacement of the tissue.

Claim 4 is incomplete in that the claim fails to initially set forth a step of measuring the data to be displayed. It is unclear as to how there can be data to be displayed if there is no step of measuring the data.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-12, 14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mo et al. (US 6450959) in view of Criton et al. (US 5800356) and Rubin et al. (US 2003/0195413).

Mo et al. show methods and apparatus for simultaneous B-mode and multi-gate spectral Doppler imaging by an ultrasound scanner system (column 2, lines 50-55). Two or more independent Doppler beams are generated by the transmitter array to sample different vessel locations, each beam being multi-gated (column 4, lines 60-65). Figure 7 shows the two spectral lines in the same image frame. The spectral data is superimposed onto the B-image (tissue Doppler image, column 4, lines 45-55). Also, an ECG signal can be used as a trigger signal (column 5, lines 25-26). Mo et al. also mention that this device would be useful for monitoring flow profile changes in conjunction with vessel wall movements over the cardiac cycle (column 1, lines 58-63). Regarding claim 18, it is well known and expedient to use standard operating guidelines to perform echocardiography imaging operations. However, Mo does not go into specific details of tissue motion, and does not specifically mention applying the gates to a heart wall.

Criton et al. disclose an ultrasonic diagnostic imaging system with Doppler assisted tracking of tissue motion. Criton et al. teach identifying the borders of the heart wall (column 1, lines 55-65); using automatic border detection (column 3, lines 5-20); measuring and displaying the displacement of the walls (column 6, line 64-column 7,

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line 15); obtaining and displaying velocity data (column 6, lines 5-15); identifying and displaying the direction of motion (column 6, lines 5-15); obtaining information over a time interval (column 3, lines 25-27); proving apical images with at least two chambers (Figure 2), and short axis view of the heart (Figure 10).

Rubin et al. disclose a method for generating a gating signal for an MRI system using an ultrasonic detector. Rubin et al. teach that a gate can be applied to a heart wall ([0046] and [0059]).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have used B-mode imaging and Doppler information to identify motion of the heart. Mo et al. briefly mention that their invention can be used to study vessel wall movements over the cardiac cycle (column 1, lines 58-63), but do not go into the specific details of calculating the tissue motion. Criton et al. provide a system and method to calculate and display tissue motion of the heart, and describe calculating and displaying the tissue motion in detail. One of ordinary skill in the art could have used the system of Mo et al. to calculate tissue motion of the heart taught by Criton et al. It would be obvious to have applied the gate to a heart wall as taught by Rubin et al., when the object of interest is the heart. It would be obvious to apply gates to any structure in the body which is being observed.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mo et al. (US 6450959) in view of Criton et al. (US 5800356) Rubin et al. (US 2003/0195413) as applied to claim 1 above, and further in view of Heimdal et al. (US 7022078).

Heimdal et al. disclose a method and apparatus for spectral strain rate visualization. Heimdal et al. teach the use of a diagnostic ultrasound system to generate and display strain rate spectrums corresponding to the deformation of tissue (abstract).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have determined the strain rate of the tissue. Knowledge of the strain rate of the tissue motion of the heart provides additional information to the physician to properly diagnose heart malfunctions in the patient.

Claims 28-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mo et al. (US 6450959) in view of Criton et al. (US 5800356), Rubin et al. (US 2003/0195413) and Dala-Krishna et al. (US 7211045).

Mo et al. show methods and apparatus for simultaneous B-mode and multi-gate spectral Doppler imaging by an ultrasound scanner system (column 2, lines 50-55). Two or more independent Doppler beams are generated by the transmitter array to sample different vessel locations, each beam being multi-gated (column 4, lines 60-65). Figure 7 shows the two spectral lines in the same image frame. The spectral data is superimposed onto the B-image (tissue Doppler image, column 4, lines 45-55). Also, an ECG signal can be used as a trigger signal (column 5, lines 25-26). Mo et al. also mention that this device would be useful for monitoring flow profile changes in conjunction with vessel wall movements over the cardiac cycle (column 1, lines 58-63). However, Mo does not go into specific details of tissue motion.

Criton et al. disclose an ultrasonic diagnostic imaging system with Doppler assisted tracking of tissue motion. Criton et al. teach identifying the borders of the heart wall (column 1, lines 55-65); using automatic border detection (column 3, lines 5-20); measuring and displaying the displacement of the walls (column 6, line 64-column 7, line 15); obtaining and displaying velocity data (column 6, lines 5-15); identifying and displaying the direction of motion (column 6, lines 5-15); obtaining information over a time interval (column 3, lines 25-27); proving apical images with at least two chambers (Figure 2), and short axis view of the heart (Figure 10).

Rubin et al. disclose a method for generating a gating signal for an MRI system using an ultrasonic detector. Rubin et al. teach that a gate can be applied to a heart wall ([0046] and [0059]).

Dala-Krishna et al. disclose a method and system for estimating the volume of blood ejected from the left ventricle of the heart for the placement of permanent pacemaker electrodes. Dala-Krishna et al. teach that imaging wall motion will allow the pacemaker electrodes to be easily implanted into the heart (column 4, lines 15-22).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have used B-mode imaging and Doppler information to identify motion of the heart. Mo et al. briefly mention that their invention can be used to study vessel wall movements over the cardiac cycle (column 1, lines 58-63), but do not go into the specific details of calculating the tissue motion. Criton et al. provide a system and method to calculate and display tissue motion of the heart, and describe calculating and displaying the tissue motion in detail. One of ordinary skill in the art could have used

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the system of Mo et al. to calculate tissue motion of the heart taught by Criton et al. It would be obvious to have applied the gate to a heart wall as taught by Rubin et al., when the object of interest is the heart. It would be obvious to apply gates to any structure in the body which is being observed.

It would have been obvious to one of ordinary skill in the art to have used the tissue motion information of the heart to aid in implanting a pacemaker. The use of wall motion information is highly desirable during the implantation procedure (Dala-Krishna, column 2, lines 60-67).

Response to Arguments

Applicant's arguments with respect to claims 1-18 and 28-34 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan G. Cwern whose telephone number is (571)270-1560. The examiner can normally be reached on Monday through Friday 9:30AM - 6:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Casler can be reached on 571-272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jonathan G Cwern/
Examiner, Art Unit 3737

/Ruth S. Smith/
Primary Examiner, Art Unit 3737